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Partial $U(1)_A$ Restoration and η Enhancement in High-Energy Heavy-Ion Collisions Zheng Huang[a] Address after August 1, 1995: Department of Physics, University of Arizona, Tucson, AZ 85721. and Xin-Nian Wang[b]

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July 12, 1995 abstract We calculate the thermally averaged rates for the η-π conversion and η scattering using the Di Vecchia-Veneziano model and t' Hooft model, which incorporate explicitly the $U(1)_A$ anomaly. Assuming an exponential suppression of the $U(1)_A$ anomaly, we also take into account the partial restoration of $U(1)_A$ symmetry at high temperatures. We find that the chemical equilibrium between η and π breaks up considerably earlier than the thermal equilibrium. Two distinct scenarios for the η freeze-out are discussed and the corresponding chemical potentials are calculated. We predict an enhancement of the thermal η-production as a possible signal of the partial $U(1)_A$ restoration in high-energy heavy-ion collisions.